Effects of propofol on tonic GABAergic inhibition in rat cerebral cortex

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$GABA_A$ receptor mediated two inhibition models, phasic and tonic. Propofol, widely used anesthetic, potentiate $GABA_A$ receptor function. We studied the effects of propofol on the tonic current in neocortex layer V pyramidal neurons using whole-cell patch clam techniques from 2- to 3- week old rat brain slice. Tonic current recorded in the presence CNQX, APV, CGP 55845, and TTX. Propofol cause a concentration-dependent increase in the amplitude of the tonic current. Picrotoxin (50 micM) completely blocked propofol effect on the tonic current. In contrast, bicuculline (10 micM) completely blocked tonic current induced by propofol low dose (3 micM) but not high dose (100 micM). Tonic current mediated by high dose propofol did respond $GABA_C$ receptor blocker TPMPA (30 micM) but not blocked by strychnine (10 micM). These suggest that low dose propofol mainly activate $GABA_A$ receptor and high dose mediate tonic current via both $GABA_A$ and $GABA_C$ receptors.